#INSPIREDMATH

MARCH 2019, VOLUME 8

FEELING LUCKY

Spring is in the air! It is right around the corner! It is hard to believe that this school year is nearly 75% complete. Have you impacted your students the way you set out to in August? Have you asked your students to take risks? Have *you* taken risks? Winston Churchill once said, “Success is the ability to go from failure to failure without losing your enthusiasm.” When things work it is not luck. It is a result of determination and drive. It is not about failing, it is about flying. Finish this year by taking a risk or two! Share your successes and failures with us. Lean on your peers. We can do this together. We don't need luck!

https://www.youtube.com/watch?v=6t557o5d1lo

PROBLEM OF THE MONTH!

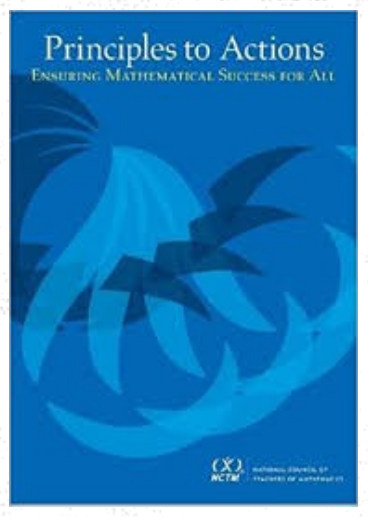
PAY ATTENTION

When a speaker gave a talk, 6% of the audience slept through the whole thing.22% of the audience stayed awake and heard the entire talk.

Of the rest of the audience, half of them heard 2/3 of the talk, and half of them heard 1/3 of the talk.

What was the average proportion of the talk that people heard?

MARCH'S FOCUS: PRACTICE #6



1. Establishing mathematics goals to focus learning
2. Implement tasks that promote reasoning and problem solving
3. Use and connect mathematical representations
4. Facilitate meaningful discourse
5. Pose purposeful questions
6. **Build procedural fluency from conceptual understanding**
7. Support productive struggle in learning mathematics
8. Elicit and use evidence of student thinking

FLUENCY AND FLEXIBILITY

Last month in our newsletter we focused on *posing purposeful questions*. We discussed transforming traditional factual questions in to reversibility, generalization, or flexibility questions. Flexibility questions allow students to solve a problem in multiple ways. Let's now define procedural fluency. According to the National Council for Teachers of Mathematics (NCTM), "procedural fluency is the ability to apply procedures accurately, efficiently, and flexibly." Flexibility is a common thread among these two practices! Fluency is not the speed at which you can solve a problem. It is about the application of procedures; the ability to transfer procedures to novel contexts; to modify procedures from previous procedures; and to recognize the appropriateness of various procedures in context. Flexibility is about the ability to be easily modified, a willingness to change or compromise, and the quality of bending easily without breaking. We love the last part in terms of our young learners. We want them to easily bend with the concepts without breaking! What are your thoughts on renaming this practice *building procedural flexibility from conceptual understanding*? Would that alter how you do things? What a great conversation to start with your peers!

THE ORDER MATTERS

Procedural fluency builds on a foundation of conceptual understanding (NGA Center & CCSSO, 2010). Research suggests that once students have memorized and practiced procedures that they do not understand they have less motivation to understand the reasoning behind them (Hiebert). Similarly, in Dennis Sheeran's book, *Hacking Mathematics*, he states that practice does not make perfect, it makes permanent. So if students are practicing a procedure they do

not understand, we are reinforcing that lack of understanding and creating a permanent deficit. Here are some suggestions from NCTM:

- Offer an initial exploration activity that allows students to use informal reasoning strategies.
- Provide experiences that help students connect procedures with underlying concepts.
- Provide opportunities to rehearse or practice strategies to justify their procedure
- Practice should be brief, engaging, and purposeful.
- Analyze students' procedures to reveal insights and misunderstandings.

DIGITAL RESOURCES THAT SUPPORT CONCEPTUAL UNDERSTANDING

THREE-ACT-TASKS

Conceptual understanding helps our students mathematize their world. Teachers are best able to support that when we use situations that are relevant, engaging, and perplexing.

SOLVE ME PUZZLES

Start with the mobiles! These puzzles are designed to support students in developing balance reasoning, which can then support them in learning how to solve equations by considering equations to be a form of balance problem.

CLOTHESLINE MATH

Provide math communities with visual, dynamic, and student-centered activities that build number sense, conceptual understanding, and procedural fluency.

VERIZON MATH FAIL

Here is an amazing example of the need for conceptual understanding! This is a very short version of the phone call. You can listen the entire call here. (We encourage you to play this shortened version for your students!)

https://www.youtube.com/watch?v=HFJlgrtpGZY

#INSPIREDMATH TESTIMONIAL

"I had always taught arithmetic sequences in a traditional way. I gave them the formula followed by different examples with varying information given. I provided them a step-by-step guideline for how to solve each problem based on what they were given. That's how my brain worked, so that's how I expected them to make sense of it. I was focusing on the procedures and not the understanding. They were too focused on which guideline to follow based on the information they were given. They made no connections to previous learning. They didn't understand the notation of the formula, so they didn't understand what to plug in where and when. That was the problem...it was not just about plugging things in.

After attending the #INspirEDmath Extravaganza put on by the IDOE math specialists, I decided to make some changes. I started by writing several arithmetic sequences on the board and asked the students what they noticed. From there, small groups were asked to come up with a definition based on their observations. Groups then shared out and I would write a sequence that exactly matched their definitions. Doing this allowed students to see the holes in their initial thinking. After revisions, students finally came up with the idea that an arithmetic sequence increased or decreased by a constant amount and that an arithmetic sequence is basically a linear function!

I used the exact same examples I had in the past, but this time I gave them time to struggle with the concept first which allowed them to figure out how to write the explicit formula regardless of what information was given instead of me giving them step-by-step examples. The results were amazing. My students became flexible in their thinking. **They understood the concept, so they were able to develop procedures on their own.**"

- Caitlin Zahn, Noblesville High School, @MrsZahn1228

ANALYTICAL ALGEBRA II UPDATES AND INFORMATION

Is your school going to offer Analytical Algebra II beginning with the 2019-2020 school year? Are you still a bit unsure of what the course actually is? Of who the course is actually for? Of how Analytical Algebra II actually differs from traditional Algebra II? IDOE's math team is here to help! We have several learning opportunities for administrators, coaches, curriculum leaders, prospective teachers of Analytical Algebra II, as well as current teachers of traditional Algebra II. Read on and sign up!

Webinars

Analytical Algebra II: The What & The Why - Tuesday, April 30, 3:30 p.m.-4:30 p.m. (ET) - In this first of two webinars we will discuss the origins and creation of the course as well as the goals of the course. Updates regarding the Commission for Higher Education (CHE) and the NCAA will be given. We will also begin to compare and contrast Analytical Algebra II with traditional Algebra II in an effort to build confidence and understanding. Register here.

Analytical Algebra II: Adapting & Gathering Resources - Thursday, May 16, 3:30 p.m.-4:30 p.m. (ET) - In this follow up webinar, we will focus on resources, specifically, how schools can utilize and adapt their current Algebra II text with Analytical Algebra II. We will also explore utilizing the math framework as well as begin to share digital resources. Register here.

Regional Summer Learning & Collaboration

Join us for a deep dive into Analytical Algebra II. Over the course of two days, educators will receive resources and pedagogical strategies that can be used to implement the course. Educators will also be given meaningful work time to collaborate with colleagues from around the state. Click on the location to register. Additional information will follow to registered participants closer to the date.

Southern Indiana - June 4 - June 5 - Jasper, IN

Central Indiana - June 6 - June 7 - Indianapolis, IN

Northern Indiana - June 10 - June 11 - Warsaw, IN

OPPORTUNITIES FOR THE FIELD

7–12 MATHEMATICS CONTENT EXPERT WORK GROUP – ROUND 3

IDOE's math content specialists are looking to convene high school educators for a third round of development on the framework. We will continue to create practical examples and provide digital resources for every standard in every high school course. All courses are still in the developmental phase.

If you are interested and available to come to the Indiana Association of School Principals building (11025 E. 25th St, Indianapolis) **Monday, April 15, 2019, from 8:30 a.m. to 2:30 p.m.** please complete the following form.

6–8 MATHEMATICS CONTENT EXPERT WORK GROUP – ROUND 2

IDOE's math content specialists are looking to convene middle school educators for a second round of development on the framework. We will continue to create practical examples and provide digital resources for every standard in grade 6-8 mathematics, as well as Algebra 1. All courses are still in the developmental phase.

If you are interested and available to come to the Indiana Association of School Principals building (11025 E. 25th St, Indianapolis) **Friday, April 26, 2019, from 8:30 a.m. to 2:30 p.m.** please complete the following form.

K–5 MATHEMATICS CONTENT EXPERT WORK GROUP – ROUND 2

IDOE's math content specialists are looking to convene elementary school educators for a second round of development on the framework. We will continue to create practical examples and provide digital resources for every standard in grade K-5 mathematics. All courses are still in the developmental phase.

If you are interested and available to come to the Indiana Association of School Principals building (11025 E. 25th St, Indianapolis) **Tuesday, April 30, 2019, from 8:30 a.m. to 2:30 p.m.** please complete the following form.

EDUCATOR SPOTLIGHT: MEGAN SHEPTOSKI

My name is Megan Sheptoski, and I am delighted to be featured in this month's newsletter! I am currently in the second year of my teaching journey. This year I started a new position at Highland Middle School in Anderson teaching 6th grade math. I have had the privilege to assist in piloting an honors math course this year and have loved the challenge of pushing these bright minds to their fullest potential.

In my classroom, I strive to break the preconceived notion many of my students hold-that mathematics is a set of steps, rules, and computations. Students engage in explorations,

discussions, debates, technology, and more to form an individualized perspective on mathematics. I do not believe that mathematics should be about memorization of rules, but rather a celebration of creative strategies to solve real-world problems. To facilitate a productive disposition among my mathematicians, it is imperative that students feel safe to ask questions and make mistakes. Therefore, building relationships with and among students is not only the most enjoyable, but the most important part of my job! I have always been very passionate about mathematics and am continuously looking for more ways to inspire this passion in my students. Let me know what you do to inspire your students - connect with me on twitter @sheptoski.

MATHEMATICS EDUCATOR SPOTLIGHT NOMINATION

We are always looking for rock-star math educators who are innovative and inspiring. Educators who lead, learn, and collaborate with humility and passion. If you know someone (or are that someone) click the button and nominate them (or yourself)!

SCHOOL IMPROVEMENT UNVEILS ITS REDESIGNED WEBSITE!

This week, the Office of School Improvement has launched a redesigned website to ease identifying and accessing the resources available for districts and schools. These resources include a series of trainings to help schools and districts conduct comprehensive needs assessments and develop high-quality school improvement plans. Visitors can view recordings of these trainings online. The trainings can be downloaded to incorporate in district or school-based presentations. These resources have been developed with the needs of Comprehensive Support and Improvement and Targeted Support and Improvement schools in mind. The resources are grounded in best practices for continuous school improvement applicable for all schools.

SUPPORTS FROM ASSESSMENT

ILEARN MATHEMATICS FAQS

The Office of Assessment has provided a document answering all of your questions regarding the ILEARN assessment, test blueprints, item specifications, calculator policies, and much more!

RANGE PERFORMANCE LEVEL DESCRIPTORS

Do you want to know what's going to be tested on the ILEARN Mathematics assessment? PLDs are a great resource! PLDs share the knowledge and skills related to the Indiana Academic Standard that students need to show on the ILEARN assessment.

YOUR IDOE MATHEMATICS TEAM

ROBIN CONTI

@RobinLConti

Secondary Mathematics Specialist

Indiana Department of Educati...
rconti@doe.in.gov
(317)-233-6098
doe.in.gov

BEAU SCOTT

@NerdCoreTeacher

Elementary Mathematics Specialist

Indiana Department of Educati...
jscott3@doe.in.us
(317)-232-9142
doe.in.gov